ACOMPARATIVE STUDY BETWEEN EFFECTIVENESS OF SWISS BALL TRAINING AND CONVENTIONAL BALANCE TRAINING VERSUS CONVENTIONAL BALANCE TRAINING TO IMPROVE BALANCE IN SUBACUTE STROKE PATIENTS

A Dissertation Submitted In Partial Fulfillment

of the Requirements for the Degree of

MASTER OF PHYSIOTHERAPY

With Specialization In

ADVANCED PHYSIOTHERAPY IN NEUROLOGY

Register Number: 27091411

Submitted to

THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY
Chennai

JKK MUNIRAJAH MEDICAL RESEARCH FOUNDATION

COLLEGE OF PHYSIOTHERAPY

Department Of Post Graduate Studies

Komarapalayam - 638 183

April - 2011

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CERTIFICATE

This is to certify that the research work entitled A Comparative Study between Effectiveness Of Swiss Ball Training And Conventional Balance Training Versus Conventional Balance Training To Improve Balance In Subacute Stroke was carried out at JKK MUNIRAJAH MEDICAL RESEARCH FOUNDATION COLLEGE OF PHYSIOTHERAPY, KOMARAPALAYAM, affiliated to The Tamilnadu Dr. M.G.R Medical University, Chennai- 32 towards partial fulfillment for the award of Degree of "Master of Physiotherapy" course with "Advanced Physiotherapy in Neurology" as specialization. This work was done under the supervision and guidance of Assistant Professor Mr. R. John Vinoth Raj, M.P.T., (Neuro), MIAP.

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Acknowledgement

I prioritize my thanks to the Almighty for his external grace.

I wish to express my heartfelt appreciation to my **father Mr.R.Samathanam** my **mother Mrs. Rathi** and my **brother and sister** for their valuable support throughout my study.

I wish to express my heartfelt appreciation to my **husband Mr.V. Anand** and my **child Mr.Amurith Anand** valuable support throughout my study.

I express my heartful thanks to my brother ***DR. S.K.RAJKUMAR M.P.T , M.I.A.P, Ph.D*** for their support throughout my course of study

I express my heartfelt thanks to t h e management **DR.JKK. MUNIRAJAHH, M.Tech (Bolton**) the managing trustee of JKKMMRF college of physiotherapy for his support in completion of my study .

I express my sincere thanks to **Mr. kalaivani B.P.T, M.I.A.P**,for their support throughout my course of study

I express my thanks to my principal of JKKMMRF college of physiotheraphy **MR.D.KANNAN, M.P.T, M.I.A.P &** professo**r MR.JOHN VINOTH M.P.T** for supporting my project.

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INTRODUCTION

INTRODUCTION

Hemiplegia is one of the commonest neurological disorder seen these days generally the hemiplegia patients affect the limb movements and the body balance besides other disabilities.

When the upright posture sitting requires the proper functioning of a number of central balancing mechanism. The afferent impulses of wide spread origin including signals from periphery play an important role in eliciting and guiding responses. While the efferent impulses carry the message to muscles for the execution of the balancing act.

Damage to any one of the central balancing mechanisms might result in deficiency of balance.

The damage to sensory or motor pathways and the imbalance of the trunk musculature may lead to deficient balance in hemiplegic patients. Conventional balance training for stroke patients given in sitting and standing postures.

The Swiss ball has been used in physiotherapy for neuromuscular / neuro developmental treatment for the last 40 years. (Oettery and Larsen 1996).

The Swiss ball is one of the devices for proprioceptive feedback. It is an easily perdurable element suitable for rocking the posture of the patients to train the balance control.

AIM OF THE STUDY:

To compare the study between effectiveness of swiss ball training and conventional balance training versus conventional balance training to improve balance in subacute stroke patients.

O BJECTIVE

- To determine the effect of swiss ball training& conventional balance training in improving the balance in subacute stroke patients with berg balance scale.

- To determine the effect of conventional training in improving the balance in subacute stroke patients with berg balance scale

- To determine the effectiveness of swissball training &conventional balance training versus conventional balance training to improve balance in subacute stroke patients..

HYPOTHESIS

NULL HYPOTHESIS:

The null hypothesis states that there were no significant difference between Swiss ball training and conventional balance training versus conventional balance training to improve balance in sub acute stroke patients.

ALTERNATE HYPOTHESIS:

The alternate hypothesis states that there was significant difference in Swiss ball training and conventional balance training versus conventional balance training to improve balance in sub acute stroke patients

REVIEW OF LITERATURE

1. Stanton R et. al., - 2004:

Conducted on experimental study on 18 young male athletes. The aim of the study was to determine the effect of short term Swiss ball on core stability.18 clients were divided into control and experimental groups. The Swiss ball training 2 sessions per week for 6 weeks was given. The outcome was measured by core stability, electromyographic activity of abdominal and back muscles and running posture

The result of the study showed that positive effects in core stability, electromyographic activity of abdominal and back muscles and running posture. The study concluded that Swiss ball training had improved affect on core stability

2. Tung FL et. al., – 2010:

Conducted on experimental study on 32 patients with stroke. They were divided into 2 groups train was given to 3 times a week for four weeks. The aim of the study was to determine the effectiveness of sit to stand training in individual with stroke. The main outcome was measured by berg balance scale and extensor muscle strength of lower extremity

Result of the study showed that significant improvement in directional control and affected hip extensor strength. The study concluded that additional sit to stand training is encouraged on dynamics balance in subject with stroke

3. Lubetzky - Vilnai A et. al.,

Conducted a systemic review search published between January 2006 and February 2010. Aim of the study to evaluate the evidence related to the effect of balance training on balance performance among individuals post stroke. 22 published studies met the inclusive criteria. Moderate evidence for one to one balance training or group therapy for acute, sub acute or chronic stroke for 2-3 times/ week

The study concluded that use of balance exercise to improve balance performance for moderately severe stroke

4. Lehman GJ et. al., -2005:

The aim of the study was to determine whether the addition of a swiss ball to trunk bridbinb exercises influences trunk muscle activity. The outcome was measured by myoelectric activity of trunk muscles Briding exercises were performed on the floor as well as on a labile surface {Swiss ball}. The result of the study showed that during the prone bridge the addition of an exercise ball resulted in increased myoelectric activity in the rectus abdominis and external oblique.

The study concluded that addition of a Swiss ball is capable of influencing trunk muscle activity in the rectus abdominis and external oblique musculature during prone bridge exercises

5. Marshall PW et. al.,-2005:

Conducted an experimental study on 8 healthy volunteers from a university population. The aim of the study was to assess lumbo pelvic muscle activity during different core stability during different core stability exercise on and off a Swiss ball. Intervention: press-up, upper body roll- out, single- leg hold and quadruped exercise were given to the patient. The main outcome was measured by visual analog scale, surface electromyography. The result of the study showed that increase in the activation of the rectus abdominis with Swiss ball.

The study concluded that study showed that swiss ball provides a training stimulus for the rectus abdominis.

6. Behm DG et. al., – 2005:

Conducted an experimental study on 11 patients between 20 and 45 years of age participated. The aim of the study was to evaluate the effect of unstable and unilateral resistance exercises on trunk muscle activation. The main outcomes were measured by electromyographic activity of the upper lumbar, lumbosacral erector spinae and lower-abdominal muscles. The result of the study shows increased activation of above muscles

The study concluded that most effective means for trunk strengthening should involve back (or) abdominal exercises with unstable bases.

7. Combs SA et. al., – 2010:

Conducted an experimental study on 12 patients with chronic stroke. The program included whole body goal focused activities, gait training and strengthening exercises for 4h, 5 days per week for 2 week. The aim of the study to determine that of the intensive, task- specific intervention was a feasible program for these participants with stroke. The main outcomes measured by wolf motor function test, berg balance scale, timed up and go test and 6-min walk test and stroke impact scale and Canadian occupational performance measure. The result of the study shows that the effect of the intervention on participation based outcomes was much greater than on the activity based outcomes

The study concluded that improvements in participation with personal goal- related activities

8. Marigold DS et. al., - 2005:

Conducted on experimental study on 61 community dwelling older adults with chronic stroke. Intervention – participants were randomly assigned to an agility (n=30) or (n=31) exercise groups. Both groups exercised 3 times a week for 10 weeks. The aim of the study was to determine the effect of the two different community based group exercise programs on functional balance, mobility, postural reflexes and falls in older adults with chronic stroke. The main outcomes was measured by berg balance , timed up and go, step reaction time, activities- specific balance confidence and nothingham health profile. The result of the study shows that to improvements in all clinical outcome measures for both groups, the agility

group demonstrated greater improvements in step reaction time and paretic rectus femoris postural reflex onset latency than the stretching / weight shifting group

The study concluded show that improve postural reflexes, functional balance and mobility may lead to a reduction of falls in older adults with stroke

9. Vearrier LA et. al., - 2005

Conducted on experimental study on 10 patients with chronic stroke disability 6 hours / day for consecutive weeks. The aim of the study was to determine the test if the intensive massed practice intervention could significantly improve balance function post – stroke. The outcome was measured by the clinical tests and time to stabilization (TTS) of the center of pressure in response to a platform perturbation. The result of the study states that improvements in anticipatory and steady- state balance control.

The study concluded show that intensive massed practice of standard physical therapy produced significant results in balance retraining with patients post stroke.

10. Bayouk JF et. al., - 2006

Conducted on experimental study on 61 hemiparetic subjects at least 6 months post stroke. The aim of the study was to compare the effects of a task oriented exercise program with and without altered sensory input on postural stability in subjects with stroke. The outcome was measured by

center of pressure (cop), double – legged stance and sit- to-stand under (4 sensory conditions: 1.eyes open, normal surface 2. Eyes open soft surface 3.eyes closed, normal surface 4.eyes closed soft surfaces) 10- min walking test. The result of the study was showed that more effective at improving the standing balance of stroke subjects than a conventional task oriented program.

The study concluded that shows more effective at improving the standing balance of stroke subjects than a conventional task oriented program.

11. Salbach NM et. al., – 2006

Conducted on experimental study on a 91 patients with a first stroke. The aim of the study was to determine the relative importance of balance self efficacy compared with functional walking capacity in predicting physical and perceived health status. The main outcome was measured by the activities specific balance confidence (ABC) scale, short- form health survey physical function scale and EQ- 5D visual analog scale.

The result of the study showed that enhancing balance self efficacy in addition to functional walking capacity may lead to greater improvement.

MATERIALS:

- Swiss ball
- Mat
- Couch
- Pillows
- Chair
- Assessment chart
- Hammer
- Marking tools
- Berg balance scale
- Ruler
- Two standard chairs (1 with arm rests, 1 without)
- Footstool or step
- Stopwatch
- 15 ft walkway

METHODOLOGY:

Study Design

Quasi- experimental design.

Study Setting

The study was conducted at out patient department in J.K.K. Munirajahh Medical Research Foundation College of Physiotherapy, Komarapalayam and District Head Quarters Hospital, Erode under the supervision of the concerned authorities

Study Sampling

A total number of 30 subjects with sub acute stroke patients were selected by convenient sampling method after the consideration of inclusion and exclusion criteria and they were divided into group A and group B with 15 subjects in each group.

Study Duration

Duration of study: 1 month.

Group A: 45 min (Conventional training) for 5 days per week for a period of 1 month.

Group B: 45 min (30 min conventional experimental) 15 min Swiss ball for 5 days per week for a period of 1 month.

Inclusion Criteria

- The sub acute hemiplegic patients who were medically stable and also cooperative

- Both male and female patients
- Embolism
- Age between 45 to 60 years

Exclusion Criteria

- The patients having seizures
- Patients having any secondary complications
- Cognitive defects
- Dysarthria
- Aphasia
- Degenerating and demyelinating conditions

Parameters

- Berg balance scale

Procedure

The sample size of 30 subjects was selected who satisfied inclusion criteria.

They were divided into two groups, one as group A, and other as group B for each 15 subjects. A pre test score was evaluated by using berg balance scale.The group A of the hemiplegic patients was treated by conventional therapy for 45 min for 5 days per week for a period of 1 month.

The group B of the hemiplegia patients was treated by 30 min conventional therapy & 15 min Swiss ball training for 5 days per week for a period of 1 month.

Before the data collection procedure the purpose and benefits of the swiss ball training and conventional balance training were explained to patients and caregivers.

The hemiplegic patients were assessed through proform and the pre test scores were recorded before the balance exercises were introduced. The post test scores were observed from both group A and group B by using Berg balance scale after the completion of the treatment regimen.

PARIED 't' TEST:

The paired t- test was used to compare the pre and post test values of swissball training combine with conventional balance training versus conventional balance training for group A and group B

Formula: Paired "t" Test

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\ \sqrt{n}}{S}$$

d = Difference between the Pre Test Vs Post Test

$\bar{d}$ = Mean difference

n = Total number of subjects

S = Standard deviation

UN PAIRED "t" – TEST

The unpaired t-test was used to compare the mean difference between Group A and Group B subjects treated with swissball training combine with conventional balance training versus conventional balance training.

Formula:- Unpaired 't' test

$$S = \sqrt{\frac{(n_1-1)\,S_1^2 + (n_2-1)\,S_2^2}{n_1 + n_2 - 2}}$$

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

n_1 = Total number of subject in Group - A

n_2 = Total number of subject in Group - B

x_1 = Difference between Pre test Vs Post test of Group - A

$\bar{x}_1$ = Mean difference between Pre test Vs Post test of Group - A

x_2 = Difference between Pre test Vs Post test of Group - B

$\bar{x}_2$ = Mean difference between Pre test Vs Post test of Group - B

DATA PRESENTATION

TABLE 1

BERG BALANCE SCALE				
S.No	CONTROL GROUP		EXPERIMENTAL GROUP	
	Pre-Test	Post- Test	Pre-Test	Post- Test
1	33	39	33	44
2	28	34	29	40
3	30	36	30	43
4	25	31	25	36
5	28	37	27	39
6	25	31	25	38
7	31	37	29	41
8	26	31	33	43
9	29	35	26	41
10	26	32	29	37
11	32	38	28	39
12	29	38	26	40
13	26	38	33	44
14	33	42	29	45
15	31	38	33	44

DATA ANALYSIS AND INTERPRETATION

GROUP –A

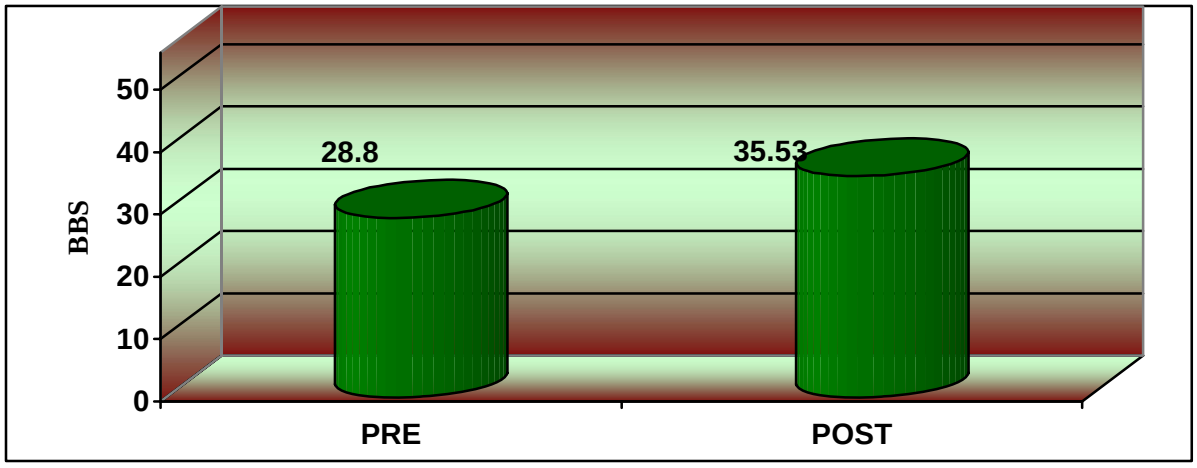
The comparative mean value, mean difference, standard deviation and paired "t" values between pre Vs post test of Swiss ball balance training and conventional balance training in group A.

TABLE-II

S.No	Test	Improvement			Paired t-Value
		Mean	Mean Difference	S.D	
1.	Pre test	28.8	6.73	1.21	22.3
2.	Post test	35.53			

It shows the analysis of Patient Rated subacute stroke,the paired 't' value of pre Vs post sessions of group A was 22.3 at 0.05level of significance, which was greater than the tabulated value of 2.14.This showed that there was a statistical significant difference in between preVs post test results. The pre test mean was 28.8, the post test mean was 35.53and mean difference was 6.73, which showed that there was a increase in Patient Rated subacute stroke in post test indicating the recovery of selected samples in response to intervention.

GRAPH-1 PATIENT RATED SUBACUTE STROKE EVALUATION OF GROUP-A



GROUP –B

The comparative mean value, mean difference, standard deviation and paired “t” values between pre Vs post test of conventional balance exercises in group B.

TABLE- III

S.No	Test	Improvement			Paired t-Value
		Mean	Mean Difference	S.D	
1.	Pre test	29	12.06	4.07	11.31
2.	Post test	41.06			

It shows the analysis of Patient Rated subacute stroke,the paired ‘t’ value of pre Vs post sessions of group A was 11.31 at 0.05level of significance, which was greater than the tabulated value of 2.14. This showed that there was a statistical significant difference in between preVs post test results. The pre test mean was 29, the post test mean was 41.06and mean difference was 12.06, which showed that there was a increase in Patient Rated subacute stroke in post test indicating the recovery of selected samples in response to intervention.

GRAPH-2 PATIENT RATED SUBACUTE STROKE EVALUATION OF GROUP-B

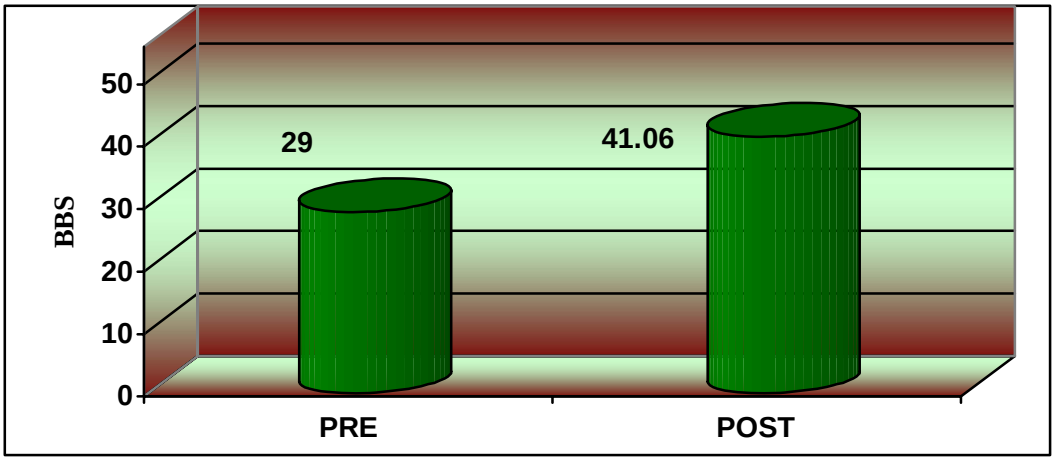


TABLE – IV

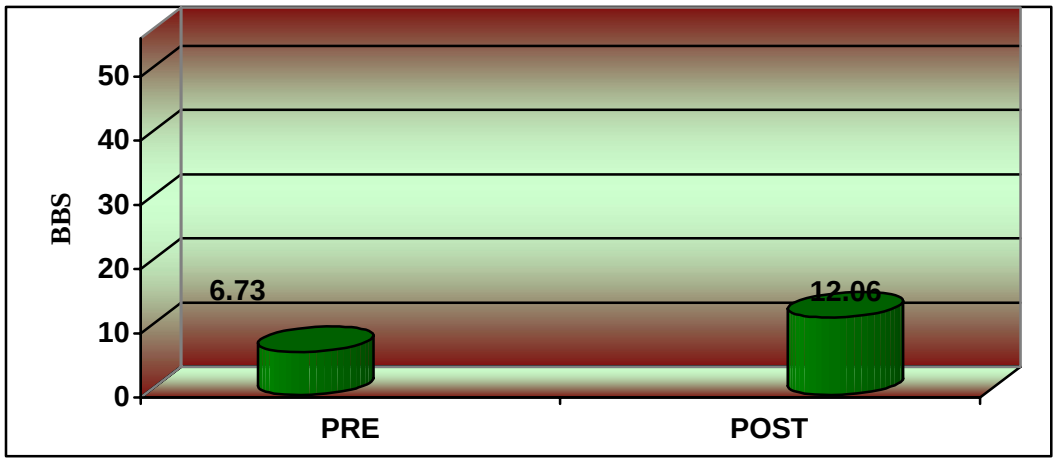
Table IV represents the comparative mean values, mean difference, standard deviation, and unpaired‘t’ value between group A and group B on Patient Rated subacute stroke

S.No	Berg Balance Scale				UnPaired t-Value
		Mean	Mean Difference	S.D	
1.	GROUPA	6.73	5.33	3	4.9
2.	GROUPB	12.06			

Table IV shows the analysis of group A and group B with Patient Rated sub acute stroke. The unpaired‘t’ value of 4.9 was greater than the tabulated ‘t’ value of 2.05, which showed that there was statistically significant difference at 0.05 level between group A and group B. The mean value of group A was and the mean value of group B was 8, which showed that there was a greater improvement in groupB than group A.

Therefore, the study is rejecting the null hypothesis and accepting the alternate hypothesis.

GRAPH -3 MEAN DIFFERENCE BETWEEN GROUP A & GROUP B



DISCUSSION

The purpose of the study was to find the effect of Swiss ball combine conventional balance training significantly improvement of balance in sub acute hemiplegic patients using berg balance scale.

Balance is diminished in people with hemiplegia and hemiparesis. Postural sway for patients with hemiplegia can be twice that of their age matched peers. Symmetry of weight bearing is also impaired following stroke, with patients bearing as much as 61/to 81/ of their body weight through nonparetic lower extremity. Hemiplegia also can cause a reduction in patient's limits of stability. A major focus of rehabilitation program therefore is to improve 'static' dynamic balance in sitting and standing positions.

Ruth Ann Geiger, Jeffery B Allel (2001) conducted a study on 13 out patients with hemiplegia following stroke to investigate whether the addition of visual biofeedback training could enhance the effects of other physical therapy interventions on balance and mobility. Subjects were assessed using Berg Balance Scale and the Timed "up & Go" test before and after 4 weeks of physical therapy. Following intervention both groups scored higher in the berg balance scale and required less time to perform the timed up & Go test. These improvements show the increased independence of balance mobility in the study population.

Joy YM wee et. al., (1999) conducted a study on 128 hemiplegic patients to examine the utility of the Berg Balance Scale in predicting the length of stay and discharge destination. The result of the study concluded that the measuring the Berg Balance Scale scores of patients with hemiplegia admitted in acute stroke rehabilitation unit may help in approximating length of stay and predicting discharge destination and also documented that Berg Balance Scale was a better tool for assessing balance in hemiplegia.

Based on the above study results, the present study was include by Berg Balance Scale as parameter, conventional training & swiss ball as interversion produre

Smyth M.M Mason. (1998) supported the above, the Swiss ball training are effective in improving balance in patients with development & Coordination defects.

- The conventional sitting balance exercise shows no significant improvement in sitting balance in hemiplegic patients than the swiss ball sitting balance training.

A study of **Amstad, Bachlin,** and **Vonarxn** supported that hemiplegic patient balance training by using Swiss ball alone we find out the improvement in balance and core stability

- Swiss ball training combined with balance exercise improves the sitting in hemiplegic patients by stimulating balance reaction and maintain the body equilibrium responses.

This study was supported by **George Chen**, the Swiss ball training increase co ordination between muscles to provide functional strength, stability and balance.

The observed effect of this study,

- The main advantage of the Swiss ball is the base of support is less comparatively then normal bed contact in conventional balance training.
- The Swiss ball base of support is “instantaneous” i.e., the point of contact between the patient part and ball varies with the direction of rocking the ball.

IN THE ANALYSIS & INTERPRETATION OF BERG BALANCE SCALE IN SUBACUTE TO IMPROVE BALANCE TRAINING WITH SWISSBALL COMBINE WITH CONVENTIONAL BALANCE TRAINING(group A)

The paired ‘t’ value of 22.3 greater than the tabulated paired ‘t’ value of 2.14 which showed that there was satistically significant difference at 0.05 level between pre & post result. The pre test mean was 28.8& the post mean was 35.53& the mean difference was 6.73 which showed that there was stastically improve in balance with swiss ball combine with conventional training in subacute stroke patients.

IN THE ANALYSIS &INTERPRETATION OF BERG BALANCE SCALE IN SUBACUTE STROKE TO IMPROVE CONVENTIONAL BALANCE TRAINING IN SUBACUTE STROKE PATIENTS (group B)

The paired ‘t’ value of 11.31 greater than the tabulated paired ‘t’ value of 2.14 which showed that there was satistically significant difference at 0.05 level between pre & post result. The pre test mean was 29 & the post mean was 41.06 & the mean difference was 12.06 which showed that there was stastically improve in balance with conventional training in subacute stroke patients.

IN THE COMPARISION OF GROUP A & GROUP B IN THE ANALYSIS & INTERPRETATION OF BERG BALANCE SCALE OF GROUP A&B

The unpaired ‘t’ value of 4.9 was greater than the tabulated paired ‘t’ value of 2.05 which showed that there was stastically significant difference at 0.05 level between the mean difference of group A &group B. The pre Vs post test mean of group A was 6.73 & the preVs post test of mean group B was 12.06 & the mean difference of group A &B was5.33. This concludes that there was greater improvement in subacute stroke patients (swissball combine with conventional balance training)group A compared to group B (conventional balance training).

REASON FOR IMPROVEMENT IN SWISS BALL

- Structural changes such as cell growth, migration, and the formation of axons, dendrites and synapses.

- Enhances equilibrium and righting reactions, strengthening exercisescombined with proprioception training, manage muscle tonus, to train skill and function, to make exercising fun and challenging

- Swiss ball facilitate the sensori motor system: the amount of transmitter fluid released from the synaptic endings increases with frequent use. Regular exercise damask or activate silent unused synapses, axon collaterals sprout and bilateral trats become activated. And increases protective extension of the extremities

- Bouncing with the swiss ball triggers proprioceptive pathways of the CNS, thus including changes in the cortical synapsis

SUMMARY:

The aim of the study was to compare the swiss ball training combine with conventional balance versus conventional balance training to improve balance in subacute stroke patients.

A total number 30 subjects with hemiplegia were selected by convenvient sampling method after due consideration to the inclusion & exclusion criteria.

Berg balance scale were taken as parameter to measure changes. The pre treatment data were collected for group A & group B subjects & computed.

Group A subjects were given swiss ball combine with conventional therapy. Group B subjects were given conventional theraphy. The result of same parameter were record for comparision after 1 month of treatment.

The paired ‘t’ test was used to compare the pre versus post treatment result of group A & group B separately.

The unpaired ‘t’ test was used to compare the mean difference of group A & group B

In analysis & interpretation of berg balance between group A & group B the unpaired ‘t’ value of 4.9 was greater than the tabulated ‘t’ value of 2.05 which showed that there was stastically significant difference at 0.05 level between mean difference of group A & group B .The mean value of group A which was 6.73 greater than the group B value of 12.06 shows that there was significant increase in balance in group A compare to group B in response to intervention.

CONCLUSION

With the limitation of the study the following conclusion were draw from the results obtained.

Swiss ball balance exercises combine with conventional exercises show improvement in balance in sub acute hemiplegic patients

Conventional balance exercises also improve balance in sub acute hemiplegic patients.

Swiss ball balance exercise combine with conventional exercises shows more improvement than conventional balance exercise to improving balance in sub acute hemiplegic patient.

Based on these results this study concluded that Swiss ball exercises combine with conventional balance exercise is much more effective for balance training in sub acute hemiplegic patients, and also documented that berg Balance Scale is a better tool for assess balance in hemiplegia.

SCOPE OF FUTURE STUDY

- A similar study can be done with an increased sample size
- More sittings and long duration of the study will help to further study
- The comibination of proprioceptive neuro muscular facilitation (PNF) techniques and swiss ball balance training may help to futher study

LIMITATION OF STUDY

- The sample size was small so that the result cannot be generalized.
- This study was limited to a specific age group 45-60 years only.

RECOMMENDATION

- The swiss ball is used for training trunk balance and neck control in cerebral palsy

- The swiss ball is also used in fitness programme

- The swiss ball is also used in swiss ball exercise training in patients with mechanical low back pain

- Swiss ball is used in acute stage rehabilition in bedridden patients in bed in orthopaedics, neurology and cardiology units.

- Swiss ball is used in shoulder rehabilitation after shoulder injury or mastectomy

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APPENDIX

DEFINITION OF TERMS

Stroke

Stroke is rapidly developing clinical sign of focal disturbance of cerebral function of presumed vascular origin and of more than 24 hours duration.

-Susan O Sullivan

Balance

Balance is defined as the ability to control the center of mass over the base of supports within the limits of stability resulting in maintence of stability and equilibrium.

-Ghez 1975

Swiss Ball

It is a ball used as the therapeutic tool to facilitate the balance and movements.

-Kleinvogalbach 1990

Balanced Sitting

It is defined as the ability to sit without using undue muscle activity to perform a wide variety of motor tasks.

Janet H. Car 1997

TECHNIQUES

SWISS BALL BALANCE EXERCISE

1. Erect sitting with or out support on Swiss ball
2. Weight transfer – " tilts on Swiss ball" (anterior , posterior and lateral pelvic tilts performed on the Swiss ball with or with out support)
3. Bilateral side rotation on Swiss ball
4. Alternate leg raising with or without support on Swiss ball
5. Rocking the pelvis (anterior, posterior &lateral rolling)
6. Reaching the objects on Swiss ball (up & downward and sideways)
7. Sit to stand from the ball properly
8. Back to sit over the ball properly9.
9. Transfer the body from the ball to other place.

CONVENTIONAL BALANCE EXERCISE

1. Weight transfer, anterior, posterior and lateral pelvic tilt
2. Side rotation of the trunk
3. Elongation of the trunk (lateral bending)
4. Reaching the objects (upward , downward,
5. Sideward and back ward)
6. Sit to stand
7. Back
8. Erect sitting with support &with out support

LATERAL BALANCE

FORWARD BALANCE

BRIDGING

BACKWARD TILT OF PELVIS

ASSESSMENT CHART

Name :

Age :

Sex :

Mode of treatment : Swiss ball balance exercise and Conventional balance exercise

Measurement :

Parameter	Before treatment	After treatment
Berg balance scale		

Signature of the Chief physiotherapist

Signature of the Investigator

Berg Balance Scale

Name : _____

Date : _____

Location : _____

Rater : _____

ITEM DESCRIPTION SCORE (0-4)

Sitting to standing	:	_____
Standing unsupported	:	_____
Sitting unsupported	:	_____
Standing to sitting	:	_____
Transfers	:	_____
Standing with eyes closed	:	_____
Standing with feet together	:	_____
Reaching forward with outstretched arm	:	_____
Retrieving object from floor	:	_____
Turning to look behind	:	_____
Turning 360 degrees	:	_____
Placing alternate foot on stool	:	_____
Standing with one foot in front	:	_____
Standing on one foot	:	_____
Total	:	_____

Berg Balance Scale

1. SITTING TO STANDING

INSTRUCTIONS: Please stand up. Try not to use your hand for support.

( ) 4 able to stand without using hands and stabilize independently

( ) 3 able to stand independently using hands

( ) 2 able to stand using hands after several tries

( ) 1 needs minimal aid to stand or stabilize

( ) 0 needs moderate or maximal assist to stand

2. STANDING UNSUPPORTED

INSTRUCTIONS: Please stand for two minutes without holding on.

( ) 4 able to stand safely for 2 minutes

( ) 3 able to stand 2 minutes with supervision

( ) 2 able to stand 30 seconds unsupported

( ) 1 needs several tries to stand 30 seconds unsupported

( ) 0 unable to stand 30 seconds unsupported

If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

3. SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL

INSTRUCTIONS: Please sit with arms folded for 2 minutes.

( ) 4 able to sit safely and securely for 2 minutes
( ) 3 able to sit 2 minutes under supervision
( ) 2 able to able to sit 30 seconds
( ) 1 able to sit 10 seconds
( ) 0 unable to sit without support 10 seconds

4. STANDING TO SITTING

INSTRUCTIONS: Please sit down.

( ) 4 sits safely with minimal use of hands
( ) 3 controls descent by using hands
( ) 2 uses back of legs against chair to control descent
( ) 1 sits independently but has uncontrolled descent
( ) 0 needs assist to sit

5. TRANSFERS

INSTRUCTIONS: Arrange chair(s) for pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way
toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.

( ) 4 able to transfer safely with minor use of hands

( ) 3 able to transfer safely definite need of hands

( ) 2 able to transfer with verbal cuing and/or supervision

( ) 1 needs one person to assist

( ) 0 needs two people to assist or supervise to be safe

6. STANDING UNSUPPORTED WITH EYES CLOSED

INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.

( ) 4 able to stand 10 seconds safely

( ) 3 able to stand 10 seconds with supervision

( ) 2 able to stand 3 seconds

( ) 1 unable to keep eyes closed 3 seconds but stays safely

( ) 0 needs help to keep from falling

7. STANDING UNSUPPORTED WITH FEET TOGETHER

INSTRUCTIONS: Place your feet together and stand without holding on.

( ) 4 able to place feet together independently and stand 1 minute safely

( ) 3 able to place feet together independently and stand 1 minute with supervision

( ) 2 able to place feet together independently but unable to hold for 30 seconds

( ) 1 needs help to attain position but able to stand 15 seconds feet together

( ) 0 needs help to attain position and unable to hold for 15 seconds

8. REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING

INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can.

( ) 4 can reach forward confidently 25 cm (10 inches)

( ) 3 can reach forward 12 cm (5 inches)

( ) 2 can reach forward 5 cm (2 inches)

( ) 1 reaches forward but needs supervision

( ) 0 loses balance while trying/requires external support

9. PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION

INSTRUCTIONS: Pick up the shoe/slipper, which is in front of your feet.

( ) 4 able to pick up slipper safely and easily

( ) 3 able to pick up slipper but needs supervision

( ) 2 unable to pick up but reaches 2-5 cm(1-2 inches) from slipper and keeps balance independently

( ) 1 unable to pick up and needs supervision while trying

( ) 0 unable to try/needs assist to keep from losing balance or falling

10. TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING

INSTRUCTIONS: Turn to look directly behind you over toward the left shoulder. Repeat to the right.

( ) 4 looks behind from both sides and weight shifts well
( ) 3 looks behind one side only other side shows less weight shift
( ) 2 turns sideways only but maintains balance
( ) 1 needs supervision when turning
( ) 0 needs assist to keep from losing balance or falling

11. TURN 360 DEGREES

INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.

( ) 4 able to turn 360 degrees safely in 4 seconds or less
( ) 3 able to turn 360 degrees safely one side only 4 seconds or less
( ) 2 able to turn 360 degrees safely but slowly
( ) 1 needs close supervision or verbal cuing
( ) 0 needs assistance while turning

12. PLACE ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED

INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.

( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds

( ) 3 able to stand independently and complete 8 steps in > 20 seconds

( ) 2 able to complete 4 steps without aid with supervision

( ) 1 able to complete > 2 steps needs minimal assist

( ) 0 needs assistance to keep from falling/unable to try

13. STANDING UNSUPPORTED ONE FOOT IN FRONT

INSTRUCTIONS: (DEMONSTRATE TO SUBJECT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot.

( ) 4 able to place foot tandem independently and hold 30 seconds

( ) 3 able to place foot ahead independently and hold 30 seconds

( ) 2 able to take small step independently and hold 30 seconds

( ) 1 needs help to step but can hold 15 seconds

( ) 0 loses balance while stepping or standing

14. STANDING ON ONE LEG

INSTRUCTIONS: Stand on one leg as long as you can without holding on.

( ) 4 able to lift leg independently and hold > 10 seconds

( ) 3 able to lift leg independently and hold 5-10 seconds

( ) 2 able to lift leg independently and hold L 3 seconds

( ) 1 tries to lift leg unable to hold 3 seconds but remains standing independently.

( ) 0 unable to try of needs assist to prevent fall

( ) TOTAL SCORE (Maximum = 56

INFORMED CONSENT TO PARTICIPATE VOLUNTARILY IN A RESEACH INVESTICATION

Department of physical therapy (P.G studies)

JKK munirajah medical research foundation

Tamilnadu, india- 638183

NAME **::**

AGE **::**

SEX **::**

OCCUPATION **::**

ADDRESS FOR COMMUNICATION **::**

HEIGHT **::**

WEIGHT **::**

BODY MASS INDEX **::**

DECLARATION :

I certify that I have fully understood the details of the above project

I willingly consent to participate

Signature of witness **Signature of the subject**

DATE :

PLACE :

S.No	Test	Improvement			Paired t-Value
		Mean	Mean Difference	S.D	
1.	Pre test				
2.	Post test				

S.No	**Test**	**Mean**	**Mean Difference**	**S.D**	**Unpaired t-value**
1	Group A	46.5	11.7	6.03	5.54
2	Group B	34.8			

26/10/2010


26/10/2010


NECROSIS
26/10/2010


26/10/2010